

NETWORK INTERFACE APPARATUS, IMAGE PROCESSING APPARATUS, DATA PROVIDING METHOD, AND PROGRAM

BACKGROUND OF THE INVENTION

5 Field of the Invention

The invention relates to a print system, a network interface apparatus, and a printer and, more particularly, to a print system, a network interface apparatus, and a printer, for distributing and 10 arranging WEB contents (contents of information) which is provided to the user.

Related Background Art

In recent years, generally, a printer has been used in a network form owing to the spread of the

15 Internet. Usually, in a printer at a high price such as high speed printer, color printer, or the like, there is a tendency such that a network interface is built in. However, in a printer at a low price such as a monochromatic printer or the like, the network 20 interface is not built in the apparatus main body, but is often separately provided as a network card module.

In this case, the printer main body and the network card module individually have CPUs and the 25 network card module is intelligent existence. The printer main body and the network card module communicate by the connected interface. This

contrarily means that a network service of a heavy load can be ejected to the network card module, a load on the CPU of the printer main body can be relatively reduced, and costs of the printer main body can be reduced.

According to the conventional network interface, it is sufficient that merely print data represented by, for example, lpr can be transmitted. However, in recent years, since necessity to enable a host computer to manage information regarding the printer has been increased, various means have been provided as additional techniques.

As a simplest example, there is a method of enabling information management data (job control language = Job Language) to be also transmitted by a port for transmitting print data. Since the Job Language shares the port for transmitting the print data, there is no need to increase a dedicated service port and it can be relatively easily installed. However, there is a problem such that if a large amount of print data is transmitted, the port is occupied by the transmission of the print data, so that the transmission and reception of the information management data are stopped. There is also a drawback such that since the lpr protocol in the network is a unidirectional type connection, the host computer inherently cannot obtain the

information from the printer.

As a next method, there is a technique such that the information is obtained from the printer by using an SNMP (Simple Network Management

5     Protocol)/MIB (Management Information Base). It is a  
method whereby a dedicated port for data transmission  
and reception is used and the SNMP as a standard is  
used. According to such a method, however, it is  
necessary to independently develop a dedicated client  
10    program for providing a UI (User Interface) for  
receiving data from the printer by using the SNMP and  
displaying the received data. In addition, according  
to such a method, since the SNMP is originally a  
protocol for transmitting and receiving simple  
15    information, the information regarding a print layer  
can be provided only as simple data such as numeral,  
character train, or the like. Thus, the client  
program has to possess the information constructing  
the UI such as bit map image data showing a  
20    construction of an apparatus or the like. There is,  
consequently, a problem such that the client program  
has to be developed so that it can cope with all  
apparatuses.

As a latest method, there is a method whereby  
25 the network card module is equipped with a WWW server  
for providing HTTP (Hyper Text Transfer Protocol)  
services and providing WEB contents such as HTML

(Hyper Text Markup Language) data regarding the apparatus information or bit map image data via a network. A client computer displays the WEB contents onto a GUI (Graphical User Interface) by using a 5 general WEB browser. The user can also operate the printer by the displayed WEB contents. Thus, even if a dedicated client program is not provided, the user can see the information regarding the printer or operate the printer. According to the conventional 10 methods, it is necessary that the dedicated client program manages all of information (message character train, bit map images) that is peculiar to each of various apparatuses. According to the method using the WWW server, however, it is sufficient that the 15 apparatus possesses only the information regarding the apparatus itself, and products can be provided in a short period of time.

#### SUMMARY OF THE INVENTION

20 However, the foregoing conventional techniques have the following problems. That is, since the foregoing HTTP service is one of functions of the network, it is desirable that it is installed fundamentally on the network card module. In order 25 to reduce development costs by a common construction and reduce product costs by mass production, the network card module is usually designed so that it

can be connected to printers of a plurality of models.

However, each of the printers of a plurality of models has a message according to each apparatus and information that is peculiar to each apparatus.

5 Therefore, in order to provide services for the printers of all of the models, the network card module has to hold the peculiar information of all of the printers. A necessary capacity of an ROM of the network card module increases and costs increase.

10 Further, there is a problem such that in order to allow the network card module to cope also with a printer which is sold after the network card module is sold, firmware of the network card module has to be rewritten each time, surplus maintenance work

15 occurs, and costs for the maintenance rise.

The invention is made in consideration of the foregoing problems. WEB contents which depends on a type of printer is distributed and arranged to the printer main body, and WEB contents which does not depend on a type of printer is distributed and arranged to the network card module, so that the network card module does not need to have the WEB contents with respect to the printers of all models each having a possibility to be connected, and memory capacity costs of the network card module can be reduced, or the like.

Further, even if the printer copes with a

plurality of countries, it is desirable that WEB  
contents of a plurality of languages can be provided  
by a single network module. Similarly, also in the  
case where the printers are shipped to a plurality of  
5 destinations, it is preferable that the WEB contents  
of a plurality of languages can be provided by the  
single network module. For this purpose, when the  
necessary WEB contents depends on the apparatus type,  
the network card module obtains the WEB contents  
10 corresponding to designated languages from the  
printer main body.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram showing an example of  
15 a construction of a print system;

Fig. 2 is an explanatory diagram showing an  
example of an expression of an HTML;

Fig. 3 is an explanatory diagram showing a bit  
map image illustrating an outline of an apparatus as  
20 an example of WEB contents which depends on an  
apparatus type;

Fig. 4 is an explanatory diagram showing a bit  
map image serving as an abstract icon indicative of a  
request for papers as an example of WEB contents  
25 which does not depend on the apparatus type;

Fig. 5 is a flowchart showing the operation of  
a WWW server unit;

Fig. 6 is an explanatory diagram showing an information transition between modules in case of obtaining type-independent WEB contents;

5 Fig. 7 is an explanatory diagram showing an information transition between modules in case of obtaining type-dependent WEB contents;

Fig. 8 is an explanatory diagram showing a data structure in a packet format serving as a remote function call at the time when a network card unit 10 requests the WEB contents from a printing unit;

Fig. 9 is an explanatory diagram showing a data structure in the packet format serving as a remote function call at the time when a printing unit transfers the WEB contents to the network card unit;

15 Fig. 10 is a block diagram showing an example of a construction of a print system;

Fig. 11 is an explanatory diagram showing a dependent list;

20 Fig. 12 is a flowchart showing the operation of the WWW server unit;

Fig. 13 is an explanatory diagram showing a picture plane on which contents is displayed by a GUI of a host computer;

25 Fig. 14 is a block diagram showing examples of apparatus constructions which can be installed in an apparatus;

Fig. 15 is an explanatory diagram showing a

correspondence relation between bit map images and apparatus constructions;

Fig. 16 is a flowchart showing the operation of the WWW server unit;

5 Fig. 17 is a flowchart showing processes of language selecting means which is provided by the network card unit;

Fig. 18 is an explanatory diagram showing a language selecting picture plane;

10 Fig. 19 is an explanatory diagram showing a display example in case of making designation on the basis of language ID information;

Fig. 20 is an explanatory diagram showing a tree structure of the type-dependent WEB contents;

15 Fig. 21 is a block diagram showing an example of a construction of a print system;

Fig. 22 is a flowchart showing the operation of the WWW server unit;

20 Fig. 23 is an explanatory diagram showing a display example in case of making designation on the basis of destination information;

Fig. 24 is an explanatory diagram showing a display example in case of issuing a request for WEB contents;

25 Fig. 25 is an explanatory diagram showing the destination information;

Fig. 26 is an explanatory diagram showing a

tree structure of the type-dependent WEB contents;  
and

Fig. 27 is a block diagram showing an example  
of a construction of a print system.

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#### DESCRIPTION OF THE PREFERRED EMBODIMENTS

An embodiment of the invention will be  
described in detail hereinbelow with reference to the  
drawings.

10 Fig. 1 is a block diagram showing an example of  
a construction of a print system. This print system  
is constructed by: a host computer 100; a printer 101  
having a network card unit 110 and a printing unit  
120; and a predetermined communication medium 102  
15 such as Ethernet (LAN having a bus structure which  
has been developed in common by three companies of  
Xerox Co., Ltd. of U.S.A., DEC Co., Ltd., and Intel  
Co., Ltd.) or the like for connecting the host  
computer 100 and printer 101.

20 The printer can be also replaced with an image  
processing apparatus such as laser beam printer, ink  
jet printer, copying machine, hybrid apparatus,  
facsimile apparatus, scanner, or the like.

Further, the network card unit 110 of the  
25 printer 101 comprises: a network I/F unit 111; an lpd  
server unit 112; a WWW (World Wide Web) server unit  
113; a printer I/F unit 114; and a type-independent

contents storing unit 115. The printing unit 120 of the printer 101 comprises: an input buffer 121; a type-dependent contents storing unit 122; a PDL translator 123; an intermediate buffer 124; a drawing unit 125; a printer engine 126; and a network card I/F unit 127.

The above construction will now be described in detail. The network I/F unit 111 makes communication with the communication medium 102 and transfers data received via the communication medium 102 to the next stage in accordance with services. The lpd server unit 112 is a server unit for supporting a Line Printer Daemon Protocol <RFC1179> and supporting a print application based on a protocol which has been predetermined by the RFC1179 and receives print data transmitted from the host computer 100. The WWW server unit 113 transmits and receives HTML data for expressing a status of the printer 101 by using the HTTP in accordance with a request from the host computer 100. The printer I/F unit 114 transmits the print data to the printing unit 120 and requests type-dependent contents from the printing unit 120. The type-independent contents storing unit 115 stores the type-independent HTML data and bit map data into the WWW server unit 113.

The network card I/F unit 127 makes communication with the printer I/F unit 114 and

transfers data based on the communication to the next stage in accordance with the services. The input buffer 121 is constructed by an RAM or an HDD device, receives the print data, and transfers it to the PDL translator 123. The type-dependent contents storing unit 122 stores the type-dependent HTML data and bit map data. The PDL translator 123 extracts the print data stored in the input buffer 121, analyzes a PDL (Page Description Language), and converts it into intermediate data for drawing.

The intermediate buffer 124 temporarily stores intermediate data for drawing which was converted by the PDL translator 123 and transfers it to the drawing unit 125. The drawing unit 125 extracts the intermediate data for drawing from the intermediate buffer 124, converts it into raster data, and transfers it to the printer engine 126. The printer engine 126 prints an image onto paper on the basis of the raster data converted by the drawing unit 125 by using the well-known electrophotographic technique or ink jet technique and ejects a printed matter. The printer engine 126 uses the well-known print technique. For example, an electrophotographic system or an ink jet system is generally used.

Fig. 13 is a diagram showing an example in the case where the HTML data or bit map data provided by the WWW server unit 113 of the printer 101 is

displayed onto a display by the GUI of WWW browser software of the host computer 100. In Fig. 13, a construction of a picture plane is divided into two frames comprising a mode switching frame 1301 and a mode display frame 1351.

In the mode switching frame 1301, in order to divide and display the picture plane every service content for WWW services having many functions, buttons each for urging the operator to shift to each mode are arranged. There are a button 1302 to shift to a device management mode (Device Manager), a button 1303 to shift to a job management mode (Job Manager), a button 1304 to shift to a device management mode (Device Settings), and a button 1305 to shift to a support link mode (Support Links). Each button shows a shift to each mode.

The mode display frame 1351 shows a mode for displaying a device management status and is constructed by the following component elements in order from the top of the diagram. That is, 1352 showing a bit map icon of the apparatus; 1353 showing a name of the apparatus; 1354 showing an apparatus status (Status); 1355 showing an amount of paper enclosed in a paper feeding apparatus (a manual insertion tray, an upper cassette, a lower cassette, a paper deck, an envelope feeder) (Printer Information); 1356 showing a status of a paper

delivery apparatus (a paper delivery tray, bins 1, 2, and 3) (Output Information); bit map image data 1357 showing a construction of the apparatus; a button 1358 to instruct activation of utility (Utility); and 5 a button 1359 to instruct activation of a device control (Device Control).

Subsequently, the WEB contents will be described. The reason why the WWW server unit 113 is provided for the printer 101 is to enable status 10 monitoring, initial value setting, and a control of a print job of the printer 101 to be executed by the WWW browser held in the host computer 100. The WWW server unit 113 operates as a database for providing the WEB contents requested by the host computer 100.

15 Fig. 2 is a diagram showing an example of an expression of the fundamental HTML (Hyper Text Markup Language). This expression has been simplified for the purpose of describing. Actually, a further complicated document is described. In Fig. 2, a line 20 <!DOCTYPE HTML PUBLIC "-//IETF//DTD HTML 2.0//EN"> denotes a text type declaration in an SGML (Standard Generalized Markup Language) document and shows that this document is the HTML.

The HTML document is described in an area 25 between <HTML> and </HTML>.

An area between <HEAD> and </HEAD> shows a header area of the HTML document. A character train

"WEB Console Interface" between <TITLE> and </TITLE> shows a title of this document.

An area between <BODY> and </BODY> shows the inside of the HTML document. Two images are fetched  
5 in this area.

The first image data is <IMG  
SRC="/dev/device.png"> and an outline of this image is shown in Fig. 3. Since /dev/device.png is not a URL (Uniform Resource Locator) expression, it will be  
10 understood that it is internal data of the printer  
101. Further, /dev/device.png shows an external view of the printer 101 and it will be understood that it is "type-dependent WEB contents" which depends on the type of the printer 101. In case of a printer  
15 different from the ordinary printer, that is, in case of a printer of a color type or in case of a printer having a different external view in which the number of paper cassettes is small, /dev/device.png shows a different image.

20 The second image data is <IMG  
SRC="/nic/error.png"> and an outline of this image is shown in Fig. 4. Similarly, since /nic/error.png is not a URL expression either, it will be understood that it is internal data of the printer 101. Further,  
25 /nic/error.png shows an abstract image for urging the operator to supplement sheets of paper into the cassette and it will be understood that it is "type-

independent WEB contents" which does not depend on the apparatus type.

As mentioned above, the WEB contents is mainly classified into the type-dependent WEB contents and type-independent WEB contents. Usually, since it is requested that the network card unit 110 of the printer 101 is provided for the printers of a plurality of models by a single product, the type-dependent WEB contents is stored into the type-dependent contents storing unit 122 in the printing unit 120, while the type-independent WEB contents is stored into the type-independent contents storing unit 115 in the network card unit 110. In this manner, the printer 101 stores the WEB contents separately as type-dependent WEB contents and type-independent WEB contents. Further, as WEB contents which is stored into the type-dependent contents storing unit 122, the WEB contents according to the apparatus type is stored. For example, in case of device.png in Fig. 3, the image data showing an outline according to the apparatus type is stored.

Subsequently, a method of separately obtaining the type-dependent WEB contents and the type-independent WEB contents will be described. A path structure is used for distinguishing them. It is assumed that in case of the WEB contents starting with /dev/, the WEB contents is obtained from the

type-dependent contents storing unit 122 as type-dependent WEB contents, and in case of the WEB contents starting with /nic/, the WEB contents is obtained from the type-independent contents storing 5 unit 115 as type-independent WEB contents.

Fig. 5 is a flowchart showing the operation of the WWW server unit 113 of the printer 101. The WWW server unit 113 is activated together with the activation of the printer 101 and continues the 10 service until a power source is turned off. When the service is started, in step S501, the WWW server unit 113 waits for the getting operation (GET operation) from the host computer 100. The GET operation denotes an operation for requesting the WEB contents 15 in the HTTP and the processing routine is looped to the head until the GET operation comes.

When the GET operation comes from the host computer 100, in step S502, the WWW server unit 113 checks the WEB contents requested by the GET 20 operation and discriminates whether the WEB contents has been designated by the URL expression or not. For example, if a designated WEB contents name is `http://printer.domain/dev/device.html` `http://` is a scheme and `printer.domain` is a domain 25 name, so that both of them are excluded and only `/dev/device.html` is extracted.

Further, in step S504, the WWW server unit 113

discriminates whether the extracted WEB contents name starts with /dev/ or not. A rule is defined so as to obtain the WEB contents (type-dependent WEB contents) whose WEB contents name starts with /dev/ from the 5 printing unit 120. Therefore, if the WEB contents name starts with /dev/, in step S505, the WWW server unit 113 issues an obtaining request of the WEB contents to the printing unit 120. In step S506, the WWW server unit 113 waits for a response from the 10 printing unit 120. When the response is returned from the printing unit 120, in step S507, the requested WEB contents is provided to the host computer 100 by a response format of the HTTP.

If the WWW server unit 113 determines in step 15 S504 that the WEB contents is not the WEB contents starting with /dev/ (the type-independent WEB contents), the WEB contents is the WEB contents possessed by the network card unit 110. Therefore, in step S508, the WWW server unit 113 obtains the 20 relevant WEB contents from the type-independent contents storing unit 115 and provides the requested WEB contents to the host computer 100 by the response format of the HTTP.

That is, at this stage, when a path examination 25 of the URL of the WEB contents designated by the HTTP from the host computer 100 is performed, the WWW server unit 113 discriminates whether the designated

WEB contents is the type-dependent WEB contents or the type-independent WEB contents on the basis of a discrimination result about whether the designated WEB contents is matched with a specific path or not.

5 When the WWW server unit 113 obtains the WEB contents starting with /dev/ from the type-dependent contents storing unit 122 in the printing unit 120, a remote function call for executing the reading of the WEB contents is performed via the printer I/F unit

10 114 and network card I/F unit 127. The remote function call requests a file transfer from the network card unit 110 to the printing unit 120.

Fig. 8 is a diagram showing a request packet for instructing the reading of the WEB contents by the remote function call. In Fig. 8, a numerical value "100" as a Remote Procedure Call ID indicative of a reading request of the WEB contents, a number "0" indicative of the request, a data size of the packet, and a path of the WEB contents which is requested are transmitted in a packet format. When the packet is correctly interpreted by the network card I/F unit 127 of the printing unit 120, the printing unit 120 transmits a response packet.

Fig. 9 is a diagram showing the response packet for transmitting the WEB contents in correspondence to the request packet for instructing the reading of the WEB contents by the remote function call. In Fig.

9, a numerical value "100" as a Remote Procedure Call ID indicative of the reading request of the WEB contents, a number "1" indicative of the response, a response status "1" indicative of the successful 5 reading, a data size of the packet, and binary data of the WEB contents are added and transmitted. The WWW server unit 113 analyzes the response packet, extracts the WEB contents, and transmits the WEB contents to the host computer 100 by the HTTP 10 protocol.

The operation among the modules will be explained with the elapse of time. Figs. 6 and 7 are transition diagrams each showing how the obtaining process of the WEB contents requested from the host 15 computer 100 is executed among the modules. An axis of ordinate indicates the time and a transition of the requests and responses among the host computer 100, network card unit 110 of the printer 101, and printing unit 120.

20 Fig. 6 shows the operation in the case where "the type-independent WEB contents" is requested. Since the WEB contents exists in the network card unit 110, the request to the printing unit 120 is not generated but the WEB contents is extracted from the 25 type-independent contents storing unit 115 and transmitted to the host computer 100.

Fig. 7 shows the operation in the case where

"the type-dependent WEB contents" is requested. Since the WEB contents exists in the printing unit 120, the network card unit 110 makes a request to the printing unit 120, extracts the WEB contents from the 5 type-dependent contents storing unit 122, and transmits it to the host computer 100.

As described above, the WEB contents is classified into the type-dependent WEB contents and type-independent WEB contents, the type-dependent WEB 10 contents is arranged in the printing unit 120, and the type-independent WEB contents is arranged in the network card unit 110. By distributing and arranging the WEB contents as mentioned above, the following effects can be obtained.

15 (1) Since the network card unit 110 does not need to possess the WEB contents with respect to the models of all printing units each having a possibility that it is connected to the network card unit 110, costs for a memory capacity of the network 20 card unit 110 can be reduced.

(2) Because of reasons similar to those mentioned above, when coping with peculiar information of printers which are connected to the network card unit 110, that is, printing units which is developed in 25 future, there is no need to exchange the ROM of the network card unit 110.

(3) When seeing from a situation of the printing

unit 120, if the network card unit 110 is unnecessary, the printing unit 120 does not need to have the WWW server unit 113 for transmitting and receiving the WEB contents indicative of the status or the like of 5 the printer by using the HTTP and the type-independent contents storing unit 115 for storing the type-independent WEB contents, so that an increase in costs can be suppressed.

In the above embodiment, whether the WEB 10 contents is the type-dependent WEB contents or the type-independent WEB contents is discriminated on the basis of the discrimination result about whether the character train obtained by excluding the path portion from the URL of the WEB contents includes 15 "/dev/" or not. According to this method, however, whether the WEB contents is the type-dependent WEB contents or the type-independent WEB contents can be presumed by the GUI of the host computer 100. Since the storing position of the WEB contents is internal 20 information, there is also a case where it is undesirable that the WEB contents can be presumed from the URL.

Therefore, as a countermeasure for disabling the WEB contents from being presumed from the URL, 25 the following method is provided. That is, instead of the discrimination about whether the character train obtained by excluding the path portion from the

URL of the WEB contents includes "/dev/" or not, a character train list which is recognized as type-dependent WEB contents is prepared, and the character train list is compared with the WEB contents name as

5 a comparison target.

Fig. 10 is a block diagram showing an example of a construction of a print system having a dependent list 1016. This print system is constructed by: a host computer 1000; a printer 1001

10 having a network card unit 1010 and a printing unit 1020; and a communication medium 1002 for connecting the host computer 1000 and printer 1001.

Further, the network card unit 1010 of the printer 1001 comprises: a network I/F unit 1011; an

15 lpd server unit 1012; a WWW server unit 1013; a printer I/F unit 1014; a type-independent contents storing unit 1015; and the dependent list 1016. The printing unit 1020 of the printer 1001 comprises: an input buffer 1021; a type-dependent contents storing

20 unit 1022; a PDL translator 1023; an intermediate buffer 1024; a drawing unit 1025; a printer engine 1026; and a network card I/F unit 1027.

Fig. 10 is a diagram obtained by partially modifying Fig. 1. That is, according to Fig. 10, in

25 the construction of Fig. 1, the dependent list 1016 is added to the network card unit of the printer and since other component elements are similar to those

in Fig. 1, an explanation of the same portions is omitted here.

The dependent list 1016 possessed by the network card unit 1010 of the printer 1001 is a database having a list of character trains. If the dependent list 1016 has a list of character trains as shown in, for example, Fig. 11, the printing unit 1020 is requested to obtain the WEB contents having the same WEB contents name as one of the character trains. In case of other WEB contents, the network card unit 1010 provides them.

Fig. 12 is a flowchart showing the operation of the WWW server unit 1013 of the printer 1001. Fig. 12 differs from Fig. 5 with respect to a comparing condition in step S1204. In step S1204, whether the WEB contents name is included in the dependent list 1016 or not. Thus, each WEB contents can be set into the type-dependent WEB contents and type-independent WEB contents irrespective of the URL and path. Since processes in steps S1201 to S1203 and steps S1205 to S1207 in Fig. 12 are similar to those in steps S501 to S503 and steps S505 to S507 in Fig. 5, their explanations are omitted.

As described above, by using the dependent list, the list of character trains which are recognized as type-dependent WEB contents is prepared and the character train list is compared with the WEB

contents name as a comparison target. Therefore, the WEB contents can be set into the type-dependent WEB contents and type-independent WEB contents irrespective of the URL and path.

5 In the foregoing embodiment, the network card unit 1010 of the printer 1001 has the dependent list 1016.

On the other hand, in place of the construction such that the network card unit 1010 of the printer 10 1001 has the dependent list as a list of character trains which are recognized as type-dependent WEB contents, an independent list as a list of character trains which are recognized as type-independent WEB contents can be also provided. Therefore, a 15 discrimination result Yes/No in the comparing condition in step S1204 in Fig. 12 is merely reversed and the processes other than step S1204 are the same as those in Fig. 5.

In Fig. 13, with respect to the bit map image 20 1357 showing an apparatus construction of the printer 1001, when the user intends to display according to the actual apparatus construction, an image which is displayed differs in accordance with a state where an optional apparatus such as paper feed cassette, 25 duplex apparatus, paper delivery apparatus, etc. is attached to the printer main body.

Therefore, in the following construction, the

printer engine 1026 of the printing unit 1020 of the printer 1001 discriminates whether the optional apparatus such as paper feed apparatus, paper delivery apparatus, or the like has electrically been  
5 connected to the printer 1001 or not, thereby specifying the apparatus construction of the printer 1001, and the WWW server unit 1013 selects bit map image data corresponding to the apparatus construction of the printer 1001 on the basis of a  
10 transfer request of single bit map image data from the host computer 1000 and transmits it to the host computer 1000.

A displaying method of the bit map image 1357 corresponding to the apparatus construction will now  
15 be described. Fig. 14 is a diagram showing examples of apparatus constructions in the case where various optional apparatuses are installed into a certain apparatus. In this apparatus, in a standard construction, for example, one cassette which can  
20 enclose 250 sheets of paper is attached. As an option, one cassette which can enclose 250 sheets of paper or one cassette which can enclose 500 sheets of paper can be connected and, further, a duplex apparatus can be also separately connected. In case  
25 of connecting the duplex apparatus, it is necessary to install a reversing apparatus in a lower portion of the duplex apparatus main body in order to reverse

the paper in case of printing images onto both of an obverse side and a reverse side of the paper.

In the above specification, for example, there are the following six kinds of combinations which are

- 5 available as apparatus constructions as shown by the bit map images in Fig. 14, that is, a standard construction (14-1) comprising only the apparatus; a construction (14-2) in which, for example, one cassette which can enclose 250 sheets of paper is
- 10 connected to the standard construction; a construction (14-3) in which, for example, one cassette which can enclose 500 sheets of paper is connected to the standard construction; a construction (14-4) in which the duplex apparatus is
- 15 connected to the standard construction; a construction (14-5) in which one cassette which can enclose 250 sheets of paper and the duplex apparatus are connected to the standard construction; and a construction (14-6) in which one cassette which can
- 20 enclose 500 sheets of paper and the duplex apparatus are connected to the standard construction.

Since the paper delivery apparatus can be also added in addition to the foregoing paper cassettes and duplex apparatus in dependence on the apparatus (printer), the number of combinations further increases. Fig. 15 is a diagram showing a correspondence relation among the bit map images (14-

1, 14-2, 14-3, 14-4, 14-5, and 14-6 shown in Fig. 14) and "YES" (connected) / "NO" (not connected) of the various optional apparatuses (250-sheet cassette, 500-sheet cassette, and duplex apparatus).

5        In the actual check of the apparatus construction in the printer 1001, upon booting of the apparatus, the printer engine 1026 of the printer 1001 discriminates it by checking an electrical connection of a connector equipped for the printer 1001.

The type-dependent contents storing unit 1022 of the printing unit 1020 of the printer 1001 keeps the correspondence relation as shown in Fig. 15. The printing unit 1020 inquires of the printer engine

15      1026 about the apparatus construction upon booting of the apparatus, selects the bit map image data according to the apparatus construction with reference to the correspondence relation shown in Fig. 15, and returns it in the case where, for example, 20      image.png is requested.

When the host computer 1000 inquires of the printer 1001 about /dev/image.png by using the HTTP, the WWW server unit 1013 of the printer 1001 checks the path construction. If it is determined that the 25      WEB contents is the type-dependent contents, the WWW server unit 1013 inquires of the printing unit 1020. On the basis of contents of the determined apparatus

construction upon booting of the apparatus, the printing unit 1020 selects the bit map image according to the apparatus construction from among the bit map images 14-1 to 14-6 shown in Fig. 15, and 5 returns the bit map image data showing the selected bit map image to the WWW server unit 1013.

As described above, even if the host computer 1000 and the network card unit 1010 of the printer 1001 do not know the present apparatus construction 10 of the printing unit 1020 of the printer 1001, merely by inquiring the single bit map image, they can obtain the bit map image data corresponding to the present apparatus construction of the printer.

In the above embodiment, although the bit map 15 image data according to the apparatus construction has been selected from a plurality of bit map image data on the basis of the apparatus construction determined upon booting of the apparatus, there is a case where the HTML contents also changes in 20 dependence on the apparatus construction.

Therefore, in the following construction, the printer engine 1026 of the printing unit 1020 of the printer 1001 discriminates whether the optional apparatus such as paper feed apparatus, paper 25 delivery apparatus, or the like has electrically been connected to the printer 1001 or not, thereby specifying the apparatus construction of the printer.

1001, and the WWW server unit 1013 executes a parsing process to the transfer-requested HTML on the basis of a transfer request of the single HTML from the host computer 1000, fetches the apparatus

- 5 construction as an interpreting condition of an internal SSI (Server Side Include), selects a different HTML in accordance with the apparatus construction of the printer 1001, and transmits it to the host computer 1000.
- 10 A case where the HTML contents also changes in dependence on the apparatus construction will be described hereinbelow with respect to the paper feed information (Printer Information) 1355 in Fig. 13. The paper feed information 1355 shows paper feed
- 15 information in the cassette connected to the apparatus (printer), and its display contents differ in dependence on the apparatus construction at that time.

For example, if there is no option cassette,

- 20 two lines of the manual insertion tray and the upper cassette are displayed. If the 250-sheet cassette or 500-sheet cassette has been connected, three lines of the manual insertion tray, upper cassette, and lower cassette are displayed. A method of returning the
- 25 paper feed information to the host computer 1000 in accordance with the apparatus construction by extending the SSI as a function possessed by the WWW

server unit 1013 in order to switch those display lines will be described.

The SSI is, generally, a technique such that a converting process (parsing process) is executed to 5 the WEB contents obtained by the WWW server, a text described in a specific format is converted, and a conversion result is transferred to the client. As one of the SSI formats, there is a method of comparing a definition of a certain variable.

10 The converting process is a process such that the WWW server of the network card unit of the printer reads the HTML document (technically speaking, SHTML document) held in the printer and converts it into the HTML document which can be analyzed by the 15 browser of the host computer on the basis of a control sentence described in the SHTML document in accordance with the apparatus construction of the printer.

The formats in the SSI are as follows (each 20 line number is written for explanation).

```
1: <!--#if expr="ENV=VALUE1"-->
2:   syntax A
3: <!--#elif expr="ENV=VALUE2"-->
4:   syntax B
25 5: <!--#else-->
6:   syntax C
7: <!--#endif-->
```

In the above format 1:, contents in an environmental variable ENV are examined and when its value is VALUE1, the syntax A is returned to the client. If not, in the above format 3:, the contents 5 in an environmental variable ENV are examined and when its value is VALUE2, the syntax B is returned to the client. If not, the syntax C is returned to the client.

If ENV is a special keyword "LOW-CASSETTE-10 EXIST", the WWW server unit 1013 of the printer 1001 inquires of the type-dependent contents storing unit 1022 of the printing unit 1020 about the presence or absence of the lower cassette. In the example, the status obtainment by the remote function call has 15 been presumed. However, if there is means for obtaining another type constructing means (for example, an interface of a job control language or an interface of SNMP/MIB), it can be also used.

Thus, if the lower cassette exists, the WWW 20 server unit 1013 replaces contents of "LOW-CASSETTE-EXIST" with TRUW.

If the WWW contents is <!--#if expr="LOW-25 CASSETTE-EXIST=TRUE"--> <Htt1 expression regarding the lower cassette> <!--#endif-->, only when the lower cassette exists, the HTML expression regarding the lower cassette can be added and returned to the host computer 1000.

Such a procedure can be used not only in the paper feed information 1355 but also in the paper delivery information (Output Information) 1356.

As described above, even if the host computer 5 1000 does not know the present apparatus construction of the printing unit 1020 of the printer 1001, it can obtain the paper feed information and the paper delivery information from the printer 1001.

In the above embodiment, the transmission and 10 reception of, as it were, static information in which the status is specified upon activation like paper feed information in the paper feeding apparatus for feeding paper to the printer have been described. However, there is a case where the status of the 15 apparatus sequentially changes.

The transmission and reception of dynamic information of the apparatus whose status sequentially changes as mentioned above will be described hereinbelow. In the dynamic information, 20 like a status 1354 shown in Fig. 13 mentioned above, there are a status of a status LED and a status message showing a real-time status of the apparatus, a bit map icon indicative of a remaining amount of paper in the paper feed information 1355, or a bit 25 map icon and a % indicator indicative of a remaining amount of delivery paper in the paper delivery information 1356.

That is, the WWW server unit 1013 of the printer 1001 executes the parsing process to the transfer-requested HTML on the basis of the transfer request of the single HTML from the host computer 1000, fetches the status in the apparatus such as remaining paper amount regarding the paper feed, remaining delivery paper amount regarding the paper delivery in the printer 1001, or the like as an interpreting condition of the internal SSI, selects the different HTML in accordance with the internal apparatus status, and transmits it to the host computer 1000.

Fundamentally, a format in which the SSI used in the above embodiment is used in common will be explained. In the variable ENV, special keywords "STATUS\_LED" and "STATUS\_MESSAGE" are converted into a file name of a bit map image showing the status LED according to the status of the apparatus and a message according to the status of the apparatus, respectively, and transferred to the host computer 1000.

The WWW server unit 1013 of the printer 1001 searches the variable in the SSI. If STATUS\_LED is found, a status code corresponding to the present status is obtained from the printing unit 1020 and the bit map image corresponding to the LED indicator is switched to blue, yellow, and red in accordance

with the obtained status code.

Similarly, if STATUS\_MESSAGE is found, the WWW server unit 1013 obtains a status code corresponding to the present status from the printing unit 1020, 5 further, obtains a message ("printable" shown in Fig. 13) peculiar to the apparatus corresponding to the status code, and returns the message to the host computer 1000. In this case, the message peculiar to the apparatus is possessed by the type-dependent 10 contents storing unit 1022 of the printing unit 1020. The WWW server unit 1013 calls the message by using the dedicated remote function call and obtains the message.

The dynamic information is transferred to the 15 host computer 1000 in the case where the dynamic information is reloaded (read again) on the WWW browser of the host computer 1000 or after the elapse of a Refresh designation time in the HTML. The dynamic information is automatically updated after 20 the elapse of the designated time.

As described above, also in the case where a dynamic status change occurs in the apparatus (printer), the host computer 1000 can receive the LED image or message corresponding to the dynamic status 25 change from the apparatus. Therefore, an effect that is equivalent to the printer utility can be obtained by using the WWW browser of the host computer 1000.

In the embodiment, when the network card unit of the printer obtains the type-dependent WEB contents from the printing unit, the path starting with /dev/ is unconditionally designated. In the 5 printer, however, it is required that for the printing unit corresponding to a plurality of countries (a plurality of languages), a single network card product can cope with a plurality of languages.

10 Therefore, in the following construction, the network card unit 1010 of the printer 1001 has language selecting means (language selecting frame) which can select a language as shown in a picture plane of Fig. 18 and contents obtaining means for 15 obtaining the type-dependent WEB contents from the printing unit 1020 on the basis of the language selected on the picture plane of Fig. 18, thereby enabling the single network card product to provide the WEB contents corresponding to the selected one of 20 a plurality of languages.

Fig. 21 is a block diagram showing an example of a construction of a print system having a language ID storing unit. This print system is constructed by: a host computer 1000; a printer 1001 having a 25 network card unit 1010 and a printing unit 1020; and a communication medium 1002 for connecting the host computer 1000 and printer 1001.

Further, the network card unit 1010 of the printer 1001 comprises: the network I/F unit 1011; lpd server unit 1012; WWW server unit 1013; printer I/F unit 1014; type-independent contents storing unit 1015; dependent list 1016; and a language ID storing unit 1028. The printing unit 1020 of the printer 1001 comprises: the input buffer 1021; type-dependent contents storing unit 1022; PDL translator 1023; intermediate buffer 1024; drawing unit 1025; printer engine 1026; and network card I/F unit 1027.

Fig. 21 is a diagram obtained by partially modifying Fig. 10. Fig. 21 is obtained by adding the language ID storing unit 1028 to the network card unit 1010 of the printer 1001 in the construction of Fig. 10. Since other component elements are similar to those in Fig. 10, an explanation of the same portions is omitted here.

Fig. 16 is a flowchart obtained by partially modifying Fig. 12. That is, Fig. 16 is obtained by improving Fig. 12 in a manner such that when the network card unit 1010 of the printer 1001 issues a request for the type-dependent WEB contents to the printing unit 1020, a request for the type-dependent WEB contents is issued on the basis of language ID information (step S1605). Since processes in steps S1601 to S1604 and steps S1606 and S1607 in Fig. 16 are similar to those in steps S1201 to S1204 and

steps S1206 and S1207 in Fig. 12, their explanations are omitted.

Fig. 17 is a flowchart showing processes of the language selecting means (language selecting function) which is provided by the network card unit 1010 of the printer 1001. The network card unit 1010 has HTML data in which a language selection frame corresponding to the picture plane shown in Fig. 18 has been described, and waits until one of the languages is selected by the operator (step S1701). When a desired language is selected, the language ID information showing the selected language is stored into the language ID storing unit 1028 (step S1702).

In the embodiment, although the printing unit 1020 holds the type-dependent contents into the type-dependent contents storing unit 1022, the printing unit 1020 holds the type-dependent contents corresponding to a plurality of languages into the type-dependent contents storing unit 1022 so as to have a tree structure shown in Fig. 20.

In the embodiment, when the network card unit 1010 issues a request for the type-dependent WEB contents to the printing unit 1020, /dev/device.html has been designated. However, in this instance, for example, if "Japanese" is selected by the language selecting means, when the network card unit 1010 issues a request for the type-dependent WEB contents

to the printing unit 1020, /dev/jp/device.html is designated on the basis of the language ID information held in the language ID storing unit 1028, and the type-dependent WEB contents is obtained from 5 the printing unit 1020. Fig. 19 is a diagram showing a display example of WEB contents corresponding to Japanese.

As described above, the printing unit 1020 of the printer 1001 holds the type-dependent WEB 10 contents corresponding to a plurality of languages, the network card unit 1010 has the language selecting means, and the network card unit 1010 requests the type-dependent WEB contents from the printing unit 1020 on the basis of the language ID information, so 15 that the WWW service corresponding to a plurality of languages can be provided by the single network card product.

In the following construction, the network card unit 1010 has the means for obtaining destination 20 information showing to which market the printing unit 1020 is shipped from the printing unit 1020 when a power source of the printer 1001 is turned on and obtains the type-dependent WEB contents on the basis of the destination information, thereby enabling the 25 single network card product to provide the type-dependent WEB contents corresponding to a language in the destination of the product.

Fig. 27 is a block diagram showing an example of a construction of a print system which holds the destination information. This print system is constructed by: the host computer 1000; the printer 5 1001 having the network card unit 1010 and printing unit 1020; and the communication medium 1002 for connecting the host computer 1000 and printer 1001.

Further, the network card unit 1010 of the printer 1001 comprises: the network I/F unit 1011; 10 lpd server unit 1012; WWW server unit 1013; printer I/F unit 1014; type-independent contents storing unit 1015; and dependent list 1016. The printing unit 1020 of the printer 1001 comprises: the input buffer 1021; type-dependent contents storing unit 1022; PDL 15 translator 1023; intermediate buffer 1024; drawing unit 1025; printer engine 1026; network card I/F unit 1027; and destination information 1029.

Fig. 27 is a diagram obtained by partially modifying Fig. 10. That is, Fig. 27 is obtained by 20 adding a storing unit of destination information to the printing unit 1020 of the printer 1001 in the construction of Fig. 10. Since other component elements are substantially the same as those in Fig. 10, their explanations are omitted.

25 Fig. 22 is a flowchart obtained by partially modifying Fig. 12. That is, Fig. 22 is obtained by improving Fig. 12 in a manner such that a step (step

14  
15 S1600) of allowing the network card unit 1010 of the  
16 printer 1001 to obtain the destination information  
17 from the printing unit 1020 and stores it when the  
18 power source of the printer 1001 is turned on is  
5 added, and when the network card unit 1010 issues a  
19 request for the type-dependent WEB contents to the  
20 printing unit 1020, the request for the type-  
21 dependent WEB contents is issued on the basis of the  
22 destination information obtained at the time of the  
10 turn-on of the power source (step S1605). Since  
11 processes in steps S1601 to S1604 and steps S1606 and  
12 S1607 in Fig. 22 are similar to those in steps S1201  
13 to S1204 and steps S1206 and S1207 in Fig. 12, their  
14 explanations are omitted.

15 As shown in Fig. 25, the destination  
16 information is expressed by simplifying the  
17 destination by, for example, characters. "jp"  
18 indicates Japan, "us" indicates U.S.A., "fr"  
19 indicates France, and "gr" indicates Germany. In  
20 place of the characters, the destinations can be also  
21 simplified by numerical values. If the network card  
22 unit 1010 obtains, for example, "1" as destination  
23 information from the printing unit 1020, this means  
24 that the product is shipped to the Japanese market.  
25 Similarly, it is also possible to set the destination  
information "2" to U.S.A. and set the destination  
information "3" to France.

Although the printing unit 1020 holds the type-dependent WEB contents into the type-dependent contents storing unit 1022 in the foregoing embodiment, in this example, the printing unit 1020 holds the type-dependent WEB contents into the type-dependent contents storing unit 1022 so as to have a tree structure shown in Fig. 26.

Although the network card unit 1010 designates /dev/device.html when the request for the type-dependent WEB contents to the printing unit 1020 in the foregoing embodiment, in response to an inquiry about the destination information from the network card unit 1010, the printing unit 1020 notifies "1" and the network card unit 1010 designates /dev/jp/device.html on the basis of the destination information. Fig. 23 is a diagram showing a display example of WEB contents for Japan.

If the printing unit 1020 is shipped to the U.S. market, in response to obtaining of the destination information from the network card unit 1010, the printing unit 1020 returns "2" to the network card unit 1010. The network card unit 1010 designates /dev/us/device.html when the request for the WEB contents is issued to the printing unit 1020. Fig. 24 is a diagram showing a display example of WEB contents for U.S.A.

As described above, the network card unit 1010

of the printer 1001 requests the type-dependent WEB contents from the printing unit 1020 on the basis of the destination information, so that the single network card product can provide the WWW services 5 corresponding to a plurality of languages.

[Other embodiments]

(1) In the above embodiments, although the case where the printer and the host computer are connected by the communication medium such as Ethernet or the 10 like has been described as an example, a communication medium other than the Ethernet can be also used.

(2) In the above embodiments, although the case where the electrophotographic system or the ink jet 15 system is used as a print system of the printer has been described as an example, the invention can be also applied to print systems other than the electrophotographic system or the ink jet system.

(3) In the above embodiments, although the case of 20 the system in which one printer and one host computer are connected has been described as an example, the arbitrary number of printers and host computers can be also connected.

(4) In the above embodiments, although the case of 25 the printer having only the printing function has been described, the invention can be also applied to a hybrid apparatus (multifunction printer: MFP)

having an image reading function, a facsimile function, and the like besides the printing function.

5 The invention can be applied to a system comprising a plurality of apparatuses or can be also applied to an apparatus comprising one equipment.

Naturally, the objects of the invention can be also accomplished by a method whereby a medium such as a memory medium or the like in which program codes of software to realize the functions of the embodiments 10 mentioned above have been stored is supplied to a system or an apparatus, and a computer (or a CPU or an MPU) of the system or apparatus reads out the program codes stored in the medium such as a memory medium or the like and executes processes based on 15 the read-out program codes.

In this case, the program codes themselves read out from the medium such as a memory medium or the like realize the functions of the embodiments mentioned above. The medium such as a memory medium 20 or the like in which the program codes have been stored constructs the invention. As a medium such as a memory medium or the like for supplying the program codes, for example, a floppy disk, a hard disk, an optical disk, a magnetooptic disk, a CD-ROM, a CD-R, 25 a magnetic tape, a non-volatile memory card, an ROM, means for downloading them via a network, or the like can be used.

The invention incorporates not only a case where a computer executes the read-out program codes, thereby realizing the functions of the embodiments mentioned above, but also a case where an OS or the

5 like which operates on the computer executes a part or all of actual processes on the basis of instructions of the program codes, and the functions of the embodiments mentioned above are realized by those processes.

10 Further, the invention also incorporates a case where the program codes read out from the medium such as a memory medium or the like are written into a memory equipped for a function expanding board inserted into a computer or a function expanding unit

15 connected to a computer and, thereafter, a CPU or the like equipped for the function expanding board or function expanding unit executes a part or all of actual processes on the basis of the instructions of the program codes, and the functions of the

20 embodiments mentioned above are realized by those processes.

As described above, according to the print system of the invention, if the data designated from the external apparatus is the type-dependent data

25 which depends on the apparatus type, the network card module requests type-dependent data from the printer and provides it to the external apparatus, if the

designated data is the type-independent data which does not depend on the apparatus type, the network card module obtains the type-independent data from the database of the network card module and provides

5 it to the external apparatus, so that the network card module does not need to have the data with respect to models of all printers in which there is a possibility to be connected, and the costs for a necessary capacity of the network card module can be

10 reduced.

Because of reasons similar to those mentioned above, upon coping with the peculiar information of a printer which is developed in future as a printer to be connected to the network card module, it is

15 possible to cope with it without exchanging the ROM of the network card module.

When seeing from a point of view of the printer, if the network module is unnecessary, there is no need to have means for transmitting and receiving the

20 requested status of the printer by using the HTTP and means for storing the type-independent data, and an increase in costs can be suppressed.

According to the print system of the invention, when the path examination of the URL of the data

25 designated by the HTTP is made, in order to request data which is matched with the list corresponding to the type-dependent data as type-dependent data from

the printer or request data which is not matched with the list corresponding to the type-independent data as type-dependent data from the printer, the data can be set to the type-dependent data or type-independent data irrespective of the URL or path.

According to the print system of the invention, on the basis of the transfer request of the single bit map image from the external apparatus, the bit map image data according to the apparatus  
10 construction of the printer and the optional apparatuses is selected and transmitted to the external apparatus. Therefore, even if the external apparatus and network module do not know the present apparatus construction of the printer, they can  
15 obtain the bit map image data corresponding to the apparatus construction merely by inquiring the single bit map image.

According to the print system of the invention, on the basis of the transfer request of the single  
20 HTML data from the external apparatus, the parsing process based on the internal SSI is executed to the HTML data, and the different HTML data is selected in accordance with the apparatus construction and transmitted to the external apparatus. Therefore,  
25 even if the external apparatus does not know the present apparatus construction of the printer, it can obtain information such as paper feed information,

paper delivery information, or the like from the printer.

According to the print system of the invention, on the basis of the transfer request of the single 5 HTML data from the external apparatus, the parsing process based on the internal SSI is executed to the HTML data, and the internal status of the apparatus such as information regarding the paper feed or paper delivery in the printer or the like is fetched as an 10 interpreting condition of the SSI, and the different HTML data is selected in accordance with the internal status of the apparatus and transmitted to the external apparatus. Therefore, an effect similar to the printer utility can be obtained by using the WEB 15 browser of the external apparatus.

According to the print system of the invention, on the basis of the language information, the network card module issues the request for the type-dependent data to the printer and obtains the type-dependent 20 data, so that the single network module product can provide the WWW servers corresponding to a plurality of languages.

According to the print system of the invention, on the basis of the destination information showing 25 to which market the printer is provided, the network card module issues the request for the type-dependent data to the printer and obtains the type-dependent

data, so that the single network module product can provide the WWW servers corresponding to a plurality of languages.

Effects similar to those mentioned above can be obtained by the network interface apparatus, printer, data providing method, and memory medium according to the invention.